Claims

1. An apparatus for single ended stress measurement, comprising:

nested structural members such that a load on either causes a stress on the other; and

a sense element coupled to at least one of the structural members for generating a signal indicative the stress applied to the structural member that is coupled thereto.

2. The apparatus of claim 1 wherein the nested structural members comprises an inner torque bearing member inserted within an outer torque bearing member.

3. The apparatus of claim 1, wherein the sense element is coupled to the outer torque bearing member.

4. The apparatus of claim 3, wherein the sense element is magnetoelastic based or a strain gage based.

5. The apparatus of claim 1, wherein a response detector is in communication with the sense element.

6. The apparatus of claim 1, wherein the response detector is a magnetometer.

7. The apparatus of claim 2, wherein an inner radius of the outer torque bearing member is greater than an outer radius of the inner torque bearing member

8. The apparatus of claim 2, wherein the outer torque bearing member is shaped as a circular, square, rectangular, or elliptical tubing.

9. The apparatus of claim 2, wherein the inner torque bearing member is shaped as a circular, square, rectangular or elliptical tubing.

10. The apparatus of claim 2, wherein the outer torque bearing member is a rotary or non-rotary torque bearing member.

11 The apparatus of claim 2, wherein the inner torque bearing member is a rotary or non-rotary torque bearing member.

12 The apparatus of claim 2, wherein a length of the inner torque bearing member is greater than a length of the outer torque bearing member.

13 The apparatus of claim 1, wherein the sense element is coupled to the inner torque bearing member.

14 The apparatus of claim 13 wherein an inner radius of the outer torque bearing member is greater than the outer radius of the sense element coupled to the inner torque bearing member and in communication with the response detector.

15 The apparatus of claim 1, wherein the stress is a torque.

16 A method for performing a single ended stress measurement, the method comprising:

affixing a pair of generally concentric structural members relative to each other at one end thereof;

coupling a sense element to at least one of the structural members;

applying a load to at least one of the structural members distal the affixed end thereof; and

measuring a signal generated by the sense element, and correlating same to the applied load.

17. The method of claim 16 wherein the structural members comprise an inner torque bearing member inserted within an outer torque bearing member.

18. The method of claim 16, wherein the sense element is coupled to the outer torque bearing member.

19. The method of claim 16, wherein the sense element is a magnetoelastic based or strain gage based.

20. The method of claim 16, wherein a response detector is in communication with the sense element.

21. The method of claim 20, wherein the response detector is a magnetometer.

22. The method of claim 17, wherein the outer torque bearing member is shaped as a circular, square, rectangular, or elliptical tubing.

23. The method of claim 17, wherein the inner torque bearing member is a shaped as a circular, square, rectangular, or elliptical tubing.

24. The method of claim 17, wherein the outer torque bearing member is a rotary or non-rotary torque bearing member.

25. The method of claim 17, wherein the inner torque bearing member is a rotary or non-rotary torque bearing member.

26. The method of claim 17, wherein an inner radius of the outer torque bearing member is greater than an outer radius of the inner torque bearing member.

27. The method of claim 17, wherein a length of the inner torque bearing member is greater than a length of the outer torque bearing member.

28. The method of claim 17, wherein the sense element is coupled to the inner torque bearing member.

29. The method of claim 28, wherein an inner radius of the outer torque bearing member is greater than the outer radius of a sense element coupled to the inner torque bearing member and in communication with the response detector.

30. The method of claim 16, wherein the stress is a torque.

31. An apparatus for measuring load in a vehicle, comprising:

structural members generally concentric relative to each other such that a load on either causes a stress on the other; and

a sense element coupled to at least one of the structural members for generating a signal indicative the stress applied to the structural member that is coupled thereto.

32. The apparatus of claim 31, wherein the structural members comprises an inner torque bearing member inserted within an outer torque bearing member.

33. The apparatus of claim 31, wherein the sense element is coupled to the outer torque bearing member.

34. The apparatus of claim 31, wherein the sense element is magnetoelastic based or a strain gage based.

35. The apparatus of claim 31, wherein a response detector is in communication with the sense element.

36. The apparatus of claim 35, wherein the response detector is a magnetometer.

37. The apparatus of claim 32, wherein an inner radius of the outer torque bearing member is greater than an outer radius of the inner torque bearing member

38. The apparatus of claim 32, wherein the outer torque bearing member is shaped as a circular, square, rectangular, or elliptical tubing.

39. The apparatus of claim 32, wherein the inner torque bearing member is shaped as a circular, square, rectangular or elliptical tubing.

40. The apparatus of claim 32, wherein the outer torque bearing member is a rotary or non-rotary torque bearing member.

41. The apparatus of claim 32, wherein the inner torque bearing member is a rotary or non-rotary torque bearing member.

42. The apparatus of claim 32, wherein the inner torque bearing member is a non-rotary torque bearing member.

43. The apparatus of claim 32, wherein a length of the inner torque bearing member is greater than a length of the outer torque bearing member.

44. The apparatus of claim 31, wherein the sense element is coupled to the inner torque bearing member.

45. The apparatus of claim 44, wherein an inner radius of the outer torque bearing member is greater than the outer radius of the sense element coupled to the inner torque bearing member in communication with the response detector.

46. The apparatus of claim 31, wherein the stress is a torque.

47. The apparatus of claim 31, wherein the vehicle comprises a wheeled means for transport.